SECTION - III

EVERGREEN SAMPLE QUESTION PAPERS FOR PRACTICE

SAMPLE QUESTION PAPER - 1

CLASS - 12

BIOLOGY (Code No. 044)

Maximum Marks : 70 **Time Allowed : 3 hours**

General Instructions :

(*i*) All questions are compulsory.

(*ii*) The question paper has five sections and 33 questions. All questions are compulsory.

(*iii*) Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each ; Section - D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.

(*iv*) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

(*v*) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION – A

Q.1. Given below are four methods (A-D) and their modes of action (a-d) in achieving contraception. Select their correct matching from the four options that follow :

Method	Mode of Action
A. The pill	(*a*) Prevents sperms reaching cervix
B. Condom	(*b*) Prevents implantation
C. Vasectomy	(*c*) Prevents ovulation
D. Copper-T	(*d*) Semen contains no sperms

Codes :

(*a*) A-(*d*), B-(*a*), C-(*b*), D-(*c*)
(*b*) A-(*c*), B-(*d*), C-(*a*), D-(*b*)
(*c*) A-(*b*), B-(*c*), C-(*a*), D-(*d*)
(*d*) A-(*c*), B-(*a*), C-(*d*), D-(*b*)

Q.2. A sexually transmitted disease symptomised by the development of chancre on the genitals is caused by the infection of :

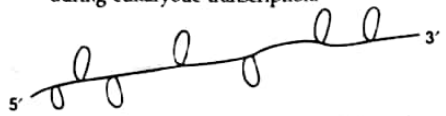
(*a*) Hepatitis-B virus
(*b*) *Treponema pallidum*
(*c*) *Neisseria gonorrhoeae*
(*d*) Human immunodeficiency virus.

Q.3. Column I lists the components of body defence and column II lists the corresponding descriptions. Match the two columns. Choose the correct option from those given.

Column I	Column II
A. Active natural immunity	(*p*) Injection of gamma globulins
B. First line of defence	(*q*) Complement proteins and interferons
C. Passive natural immunity	(*r*) direct contact with the pathogens that have entered inside
D. Second line of defence	(*s*) Surface barriers
	(*t*) antibodies transferred through the placenta

(*a*) A-(*s*), B-(*r*), C-(*t*), D-(*q*)
(*b*) A-(*r*), B-(*s*), C-(*q*), D-(*t*)
(*c*) A-(*r*), B-(*s*), C-(*t*), D-(*q*)
(*d*) A-(*t*), B-(*r*), C-(*q*), D-(*p*)

Q.4. Given below is a heterogeneous RNA formed during eukaryotic transcription.



How many introns and exons respectively are formed in this hnRNA ?

(*a*) 7, 7 (*b*) 8, 7
(*c*) 8, 8 (*d*) 7, 8

Q.5. Tobacco consumption is known to stimulate secretion of adrenaline and nor-adrenaline. The component causing this could be :

(*a*) nicotine (*b*) tannic acid
(*c*) curaimin (*d*) catechin

Q.6. Which of the following is not a plasmid ?

(*a*) Sal I (*b*) YAC
(*c*) BAC (*d*) pBR 322

Q.7. The logistic population growth is expressed by the equation.

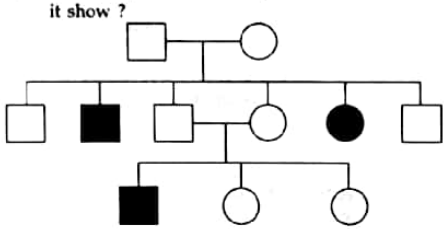
(*a*) $\frac{dN}{dt} = (b - d) \times N$

(*b*) $\frac{dN}{dt} = rN\left(\frac{N-K}{K}\right)$

(*c*) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

(*d*) $\frac{dN}{dt} = rN\left(\frac{K-N}{N}\right)$

Q.8. Study the pedigree chart given below. What does it show ?

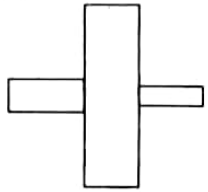


(*a*) Inheritance of a condition like phenylketonuria as an autosomal recessive trait
(*b*) The pedigree chart is wrong as this is not possible
(*c*) Inheritance of a recessive sex-linked disease like haemophilia
(*d*) Inheritance of sex-linked inborn error of metabolism like phenylketonuria

Q.9. The amount of energy transferred from one trophic level to the next higher trophic level, is

(*a*) 10% (*b*) 20%.
(*c*) 30% (*d*) 50%

Q.10. The accompanying figure represents an ecological pyramid. It is

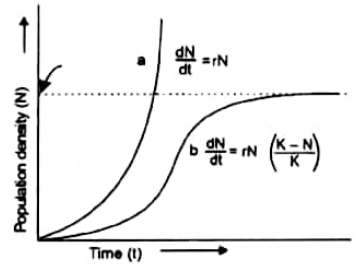


(*a*) Pyramid of numbers in grassland
(*b*) Pyramid of biomass in fallow land
(*c*) Pyramid of biomass in lake
(*d*) Pyramid of energy in a pond

Q.11. In biotechnology experiments the molecular scissors used are :

(*a*) Plasmids
(*b*) Restriction endonuclease
(*c*) Vector
(*d*) None of these

Q.12. What does K represent in the graph ?



(*a*) Carrying capacity
(*b*) Environmental resistance
(*c*) Rate of growth
(*d*) Limit of growth

Question No. 13 to 16 consist of two statements–Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

(*a*) Both A and R are true and R is the correct explanation of A.
(*b*) Both A and R are true and R is not the correct explanation of A.
(*c*) A is true but R is false.
(*d*) A is false but R is true.

Q.13. **Assertion :** Megaspore mother cell undergoes meiosis to produce four megaspores.
Reason : Megaspore mother cell and megaspores are both haploid.

Q.14. **Assertion :** Mendel was successful in his hybridization.
Reason : Garden pea proved ideal experimental material.

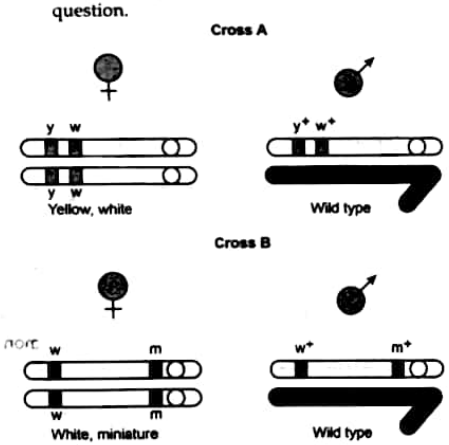
Q.15. **Assertion :** A patient of ADA- deficiency requires periodic or repeated infusion of genetically-engineered lymphocytes.
Reason : Lymphocytes are not immortal, but have life span.

Q.16. **Assertion :** Biotic potential is realised only when the environmental conditions are limiting.
Reason : Under such conditions only, the population size can increase at the maximum rate .

SECTION – B

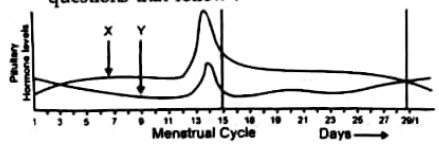
Q.17. When a cross is made between a tall plant with yellow seeds (TtYy) and a tall plant with green seed (Ttyy), what proportions of phenotype in the offspring could be expected to be
(*a*) tall and green,
(*b*) dwarf and green ?

Q.18. Study the figures given below and answer the question.



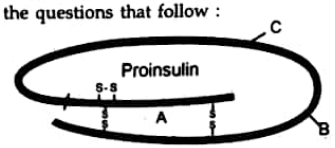
Identify in which of the crosses, the strength of linkage between the genes is higher. Give reasons in support of your answer.

Q.19. Study the graph given below and answer the questions that follow :



(*a*) Name the hormones 'X' and 'Y'.
(*b*) Identify the ovarian phases during a menstrual cycle :
(*i*) 5th day to 12th day of the cycle
(*ii*) 14th day of the cycle.

Q.20. Insulin in the human body is secreted by pancreas as prohormone/proinsulin. The schematic polypetide structure of proinsulin is given below. This proinsulin needs to undergo processing before it becomes functional in the body. Answer the questions that follow :



(*a*) State the changes the proinsulin undegoes at the time of processing to become functional.
(*b*) Name the technique the American company Eli Lilly used for the commercial production of human insulin.

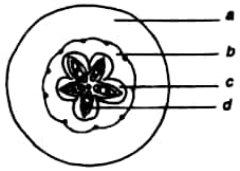
Q.21. Flow of energy through various trophic levels in an ecosystem is undirectional and non-cyclic. Explain.

Or

(*a*) Name an ideal pyramid existing in an ecosystem. Construct it upto three trophic levels, alongwith their names.
(*b*) The sun provides 1,000,000 J of sunlight (solar energy) in an ecosystem. Write the amount of energy that is available to the first and third trophic levels, respectively.

SECTION – C

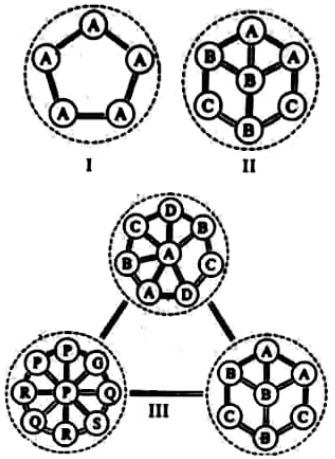
Q.22. (*a*) Apple is a false fruit, while Banana is a parthenocarpic as well as true fruit. Justify the above statement.
(*b*) What are exalbuminous and albuminous seeds ? Give one example of each.
(*c*) Label the parts a-d in the T.S. of apple fruit given below.



Q.23. (*a*) How did Hardy-Weinberg explain that allelic frequencies in a population are stable and are constant from generation to generation ?
(*b*) Why does genetic equilibrium get disturbed in a population ? Give reason.

Q.24. The reproductive cycle in the females of primate mammals (apes, monkeys and humans), is called menstrual cycle. Menstrual cycles occur during the reproductive phase, i.e., between menarche and menopause in human females. The cycle starts with menstruation and extends (for about 28 days) till the onset of the next menstruation includes four phases.
(*a*) Name in proper sequence, the four phases in menstrual cycle.
(*b*) How long does the menstrual phase last in a menstrual cycle ?
(*c*) When do the hormones estrogen and progesteron reach their peak levels, respectively, in the menstrual cycle ? Give reasons.
(*d*) Define ovulation.

Q.25. Comment on the following diagrams :
A, B, C, D, G, P, Q, R, S are species



Q.26. (*a*) What is the functional difference between B-cells and T-cells ?
(*b*) Name the source used to produce hepatitis-B vaccine using rDNA technology.

Q.27. (*i*) How vaccination and immunisation differ?
(*ii*) How does vaccination protect a person from a disease ?

Or

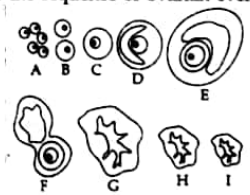
(*a*) Name the mode of reproduction by which *plasmodium* multiplies in the human body and where does it do so ?
(*b*) Shivering and high fever are the common symptoms of malaria in humans. Explain the cause of these symptoms.

Q.28. Explain giving reasons why there is greater biodiversity in tropical regions of the Earth.

SECTION – D

Question No. 29 and 30 are case-based questions. Each question has 3 subparts with internal choice in one subpart.

Q.29. The following is the illustration of the sequence of ovarian events (A-I) in a human female.

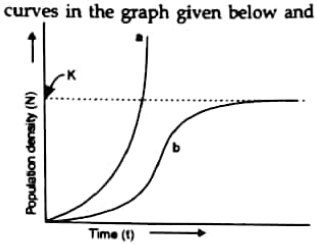


(*i*) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.
(*ii*) Name the ovarian hormone and the pituitary hormone that have caused the above mentioned event.
(*iii*) Explain the changes that occurs in the uterus simultaneously in anticipation.

Or

Write the differences between C and H.

Q.30. Study the population growth curves in the graph given below and answer the questions which follow :



(*i*) Identify the growth curves '*a*' and '*b*'.
(*ii*) Which one of them is considered a more realistic one and why ?
(*iii*) If $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ is the equation of the logistic growth curve, what does K stand for ?

Or

What is symbolised by N ?

SECTION – E

Q.31. (*a*) Arrange the following hormones in sequence of their secretions in a pregnant woman.
hCG; LH; FSH; Relaxin.
(*b*) Mention their source and the function they perform.

Or

Inspector Ajay could find only few hair strands at the crime scene. He wants to proceed for DNA fingerprinting but the amount of DNA is very less.
Answer the following questions based on the above information :
(*i*) In your opinion what could be the solution to this problem ?
(*ii*) Write the basic steps of this technique.
(*iii*) State the purpose of such an amplified sequence.

Q.32. The base sequence in one of the strands of DNA is TAGCATGAT.
(*i*) Give the base sequence of the complementary strand.
(*ii*) How are these base pairs held together in a DNA molecule ?
(*iii*) Explain the base complementarity rule. Name the scientist who framed this rule.

Or

Study the flowchart given below and answer the questions that follows.
I. S-strain → into mice → mice die
II. R-strain → into mice → mice live
III. Heat-killed S-strain + Live R-strain → into mice → A
IV. Heat-killed S-strain + DNase + Live R-strain → into mice → B
(*i*) Name the organism and differentiate between its two strains S and R, respectively.
(*ii*) Write the result A and B obtained in step III and IV, respectively.
(*iii*) Name the scientist who performed the steps I, II and III.
(*iv*) Write the specific conclusion drawn from the step IV.

Q.33. Some restriction enzymes break a phosphodiester bond on both the DNA strands, such that only one end of each molecule is cut and these ends have regions of single stranded DNA. BamHI is one such restriction enzyme which binds at the recognition sequence, 5'-GGATCC-3' and cleaves these sequences just after the 5'- guanine on each strand.
(*a*) What is the objective of this action ?
(*b*) Explain how the gene of interest is introduced into a vector.
(*c*) You are given the DNA shown below.
5' ATTTTGAGGATCCGTAATGTCCT 3'
3' TAAAACTCCTAGGCATTACAGGA 5'
If this DNA was cut with BamHI, how many DNA fragments would you expect ? Write the sequence of these double-stranded DNA fragments with their respective polarity.
(*d*) A gene M was introduced into *E.coli* cloning vector pBR322 at BamHI site What will be its impact on the recombinant plasmids ? Give a possible way by which you could differentiate non-recombinant to recombinant plasmids.

Or

(*a*) Describe the different steps in one complete cycle of PCR.
(*b*) State the purpose of such an amplified DNA sequence.